Engineering Support Services
Statistical Applications, M/S T130J
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Fax Cover Sheet

DATE:	January 14, 1996	TIME:	10:05 AM
TO:	Mary Aycock EC&D	PHONE: FAX:	x-5309 x-8244
FROM:	Tom Gatliffe Tenera Rocky Flats, LLC	PHONE: FAX:	x-6548 x-2952
RE:	REVIEW OF OU9 FIELD SAMPLING PLAN FOR ROLL-OFFS		
CC:	E. J. Nuccio, Engineering Support Services		

Number of pages including cover sheet: 3

Message

Following memo provides requested comments and recommendations.

For Info, total time charged to EA0402-01 was 5.5 hours.

Please let me know if any additional info or support is desired or required.

TBG

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KAISER ◆ HILL
COMPANY

INTEROFFICE MEMORANDUM

DATE: January 14, 1997

TO: Mary Aycock, RMRS Engineering Construction and Decommissioning, x5309

FROM: Thomas R. Gatliffe, Statistical Applications, Building T130J, x6548

SUBJECT: DRAFT OU9 FIELD SAMPLING PLAN RECOMMENDATIONS - TRG-001-97

Per your telephone request of January 13, 1997, I have reviewed the draft document entitled *Field Sampling Plan To Support The Final Disposition of Soil From The Operable Unit No. 9 Source Removal Project* and dated December 1996. The following comments and recommendations are forwarded for your consideration in preparing the final document.

Because the soil/clay pipe mixture is not strictly homogeneous, any samples must be reasonably representative of the composite matrix, if the use of statistical analyses based upon the assumption of homogeneity in the sampled material is planned. For this reason the selected sampling technique should be one which can be expected to capture all components of the heterogeneous mixture in approximately the same proportions as exist in the sampled material as a whole. Thus, as feasible, the samples should be drawn from all depths of the roll-off containers to ameliorate the effects of settling of heavier components, if any. In addition, the samples locations should be approximately evenly spaced laterally across the horizontal cross-section of each roll-off container, with one or more taken near the longitudinal centerline and others off centerline to account for potential lateral stratification, if any. Although the plan calls for samples to be taken along the sides to eliminate the need for climbing on top of the roll-off containers, samples should be taken at some separation from the container sides, 12 or more inches as feasible, in order to avoid any segregation effects that the sides may have induced in the soil/pipe matrix components.

The use of only three composite samples, may not provide sufficient confidence that the true average concentration of radionuclides lies below the specified action levels, particularly if any of the sample results approach those levels in magnitude. However, if a minimum of four samples are analyzed and all lie below the action levels, there is greater than 90 percent confidence (actually at least 93.75% confidence) that the median value of the underlying concentration distribution is less than the specified action level, even if any or all of the sample results approach the magnitude of the action levels. If, as you expect, the observed values are all well less than the action levels, greater than ninety-five percent confidence that the average level of the entire contents is less than the action level should be easily achieved with only four samples. Such an approach would thus fully satisfy the EPA Document SW-846 criteria for mean concentration. The results also assume that the measures outlined above to ensure the samples are reasonably representative of the soil/pipe matrix have been taken.

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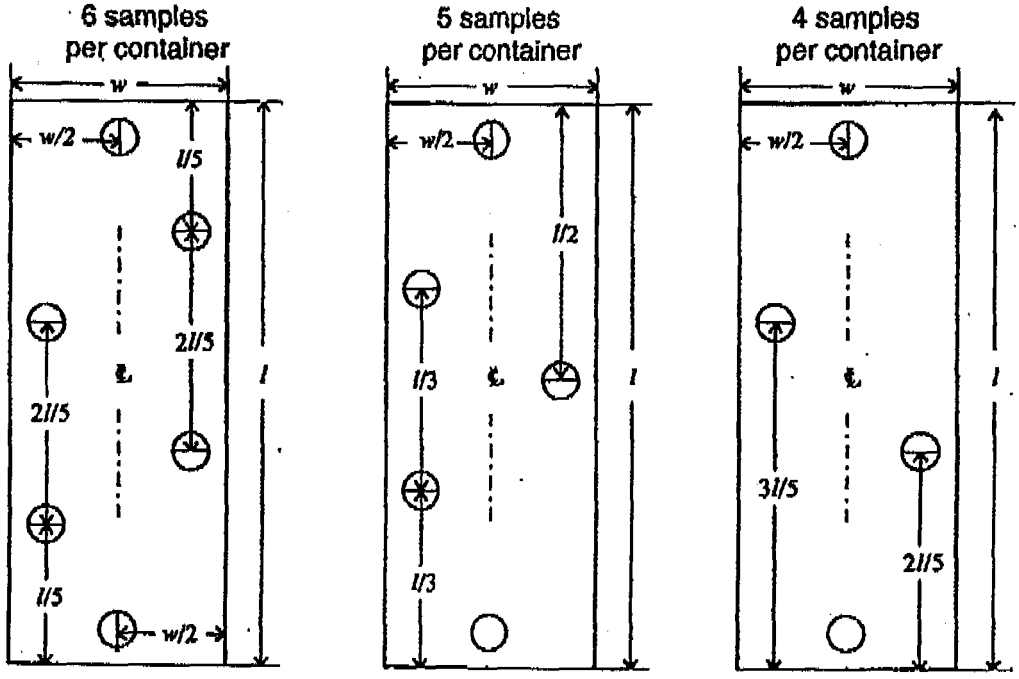
ADMIN RECORD

The pattern of sample locations proposed in the draft document is regular and easily implemented but suffers from the lack of any samples taken near the longitudinal centerline and the samples in adjacent grid corners are much closer together than they should be for true independence. In addition, twelve samples are probably more than is truly necessary unless there is reason to presuppose the existence of spatially discrete areas of significantly higher contamination within the contents of a roll-off container. My understanding is that previous experience with similar excavation materials does not suggest that this would be likely. Accordingly, I recommend the use of one or more of the patterns shown below for taking samples from individual roll-off containers. The approximate locations are identified in terms of the major roll-off dimensions of length, *l*, and width, *w*. If desired, the selected sample pattern may be mirrored on alternate containers to increase randomness without degrading validity.



If you have questions or desire further information concerning the information provided in this letter or if I may be of further assistance with regard to this or any other matter, please do not hesitate to contact me at your convenience.

cc:

E. J. Nuccio, Engineering Support Services

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